Transgrid

Connection Application Guideline

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Disclaimer

This disclaimer governs the use of this guideline. By accessing or using this guideline, you acknowledge and agree to the terms of this disclaimer in full. This guideline has been prepared by Transgrid to provide information to applicants and other interested parties about Transgrid's connection application process.

This guideline does not replace, and should not be relied on instead of, the National Electricity Law, the National Electricity Rules (NER), any other applicable laws, instruments or regulatory requirements, or the terms of any connection agreement or other agreement with Transgrid.

This guideline does not constitute an offer to connect, a connection agreement or any commitment by Transgrid to provide connection services. It does not create any binding obligation on Transgrid.

Applicants and other users of this guideline should form their own view and take their own independent expert advice as to the information in this guideline. Transgrid may amend, update or replace this guideline at any time without prior notice.

In particular (but without limiting the foregoing), the information in this guideline may change or be affected by:

- connection applications, enquiries or agreements relating to new connections, or modifications to existing connections, made or entered into by other parties;
- changes to the NER, other applicable laws or regulatory requirements, or the requirements of Australian Energy Market Operator (AEMO); and
- the impacts of any technical requirements of other network service providers (including without limitation any special protection schemes implemented by those other networks) of which Transgrid is not aware.

Transgrid may be in possession of confidential information relating to other potential connection applications or modification applications to existing connections and Transgrid is under no obligation to disclose that information to any applicant or other person.

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- that any approach or control strategies referred to in this guideline will be available for, or able to be implemented for, any particular project.

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Acronyms and definitions

Term	Definition	Remarks
AAS	Automatic Access Standard	
ADC	Aggregated dispatch conformance	
AEMO	Australian Energy Market Operator	
AVR	Automatic Voltage Regulator	
BESS	Battery energy storage system	
CA	Connection Application	
CER	Connection Enquiry Response	
CP	Connection Point	
CPA	Connection Process Agreement	
CPM	Commercial Proposal Manager	
CPTSR	Connection Point Technical Specification Report	
CSR	Connection Study Report	
CT	Current Transformer	
CUO	Continuous Uninterrupted Operation	Defined in the NER Glossary
DMAT	Dynamic Model Acceptance Test	
DNA	Dedicated network asset	
DUID	Dispatch Unit Identifier	
EMT	Electromagnetic transient	
FAT	Factory acceptance test	Plant testing in the OEM factory
FCAS	Frequency Control Ancillary Services	
FRT	Fault Ride Through	
GFL	Grid Following	

Term	Definition	Remarks
GFM	Grid Forming	
GPS	Generator Performance Standard	
GS	Generating System	
GU	Generating Unit	
HVRT	High Voltage (Fault) Ride Through	
IUSA	Identified user shared asset	Defined in the NER Glossary
kV	Kilovolts	
LDC	Line drop compensator	
LVRT	Low Voltage (Fault) Ride Through	
MAS	Minimum Access Standard	
MFRT	Multiple Fault Ride Through	
MMIB	Multiple Machine Infinite Bus	
MW	Megawatts	
MVA	Mega Volt-Amperes	
MVAr	Mega Volt-Ampere Reactive	
NAS	Negotiated Access Standard	
NEL	National Electricity Law	Available on the AEMC website
NEM	National Electricity Market	
NER	National Electricity Rules	Available on the AEMC website
OEM	Original equipment manufacturer	
OLTC	On load tap changer	Used to adjust a transformer tap position
OM	Operating manual	Transgrid operating document
OPDMS	Operations and Planning Data Management System	

Term	Definition	Remarks
P	Active Power	
PIA	Preliminary impact assessment	In relation to system strength
PPC	Power plant controller	Generating system or BESS high level control system.
PSCAD™/ EMTDC™	Power Systems Computer Aided Design / Electromagnetic Transient with Direct Current	Simulation software (EMT), also referred to as "PSCAD" in this guide.
PSMG	Power System Model Guidelines (AEMO)	
PSS®E	Power System Simulator for Engineering	Simulation software (RMS)
p.u.	Per unit	
Q	Reactive Power	
QNI	Queensland – NSW interconnector	
RACI	Responsible Accountable Consulted Informed	
RFI	Request for information	
RoCoF	Rate of change of frequency	
RUG	Releasable User Guide	
SCR	Short circuit ratio	
SLD	Single line diagram	
SSA	System Strength Assessment	PSCAD wide area studies for system strength full assessment (SSFA) or system strength stability assessment (SSSA)
SMIB	Single machine-infinite bus	A simplified representation of the power system as seen from the Connection Point.
SSIAG	System Strength Impact Assessment Guidelines	Guidelines maintained and published by AEMO.
SPS	Special Protection Scheme	
SSRS	System Strength Remediation Scheme	
SSC	system strength charge	

Term	Definition	Remarks
SSLF	System strength locational factor	
SSPA	System strength preliminary assessment	
SSQ	System strength quantity	
TAPR	Transgrid Annual Planning Report	
TOV	Transient Over-Voltage	
VCS	Voltage Control Strategy	
X/R	Reactance to resistance ratio	

Chapter 1

Your Guide to a faster, smoother assessment

Transgrid is working to make the connections process clearer, more consistent and more efficient. This Guide is one of several initiatives to improve the experience for customers. It provides clear requirements and expectations to help reduce rework, avoid unnecessary delays and support faster progress through the application process. Alongside this, we are working on risk based approaches to streamline connection pathways, while meeting the technical standards needed to maintain power system security and reliability.

1.1 Why use this Guide?

The Connection Application can be technically complex. Transgrid is taking steps to improve the efficiency of the connections process and reduce avoidable delays by providing clear upfront information and adopting consistent processes through this guideline.

Transgrid and AEMO need detailed technical information of your proposed connection, fit-for-purpose models, proposed performance standards and supporting assessments. Missing, incomplete or inconsistent information can result in further information requests, additional modelling and assessment, and repeated review cycles, increasing assessment time and costs.

This Guide takes you through the process of developing a Connection Application, from the information you'll receive and engagement activities we suggest before detailed assessments begin, through modelling, technical assessments and performance standards, to preparing and submitting the Connection Application package. It also explains how your application will be assessed and the key steps that follow submission.

The Guide is grounded in the requirements of the National Electricity Rules (NER) and draws on Transgrid's extensive experience working alongside AEMO and applicants on connection applications. It brings together established technical requirements, assessment methodologies and shared lessons from previous applications to provide practical, best-practice guidance from the start.

Using this Guide from the outset gives you a clear view of requirements, helps your submission progress smoothly through assessment, and supports a more transparent, predictable and efficient process for all parties.

1.2 Who is this Guide for?

This Guide is for applicants and their advisors seeking to connect to the Transgrid Network under the open access framework. Key users will be inverter-based resource (IBR) projects, including inverter-based asynchronous generating systems and Battery Energy Storage Systems (BESS)1. The Guide applies to the Connection Application phase, which is after the Connection Enquiry phase. Refer to the Network connections page of Transgrid's website for further information on the connections process.

1 Synchronous generator and large load connections are outside the scope of this guideline

1.3 What are the steps in the Connection Application Process?

Note: these steps take place **after** the connection enquiry phase.

Step 1: Start your application

When you submit a Notice to Apply for Connection to Transgrid, you will be assigned a Commercial Proposal Manager as your primary point of contact, who will work with you to establish the Connection Process Agreement (CPA).

Step 2: Get the network information you need

Once the CPA is executed, Transgrid will provide the network information you need to prepare your Connection Application, including a Network Data Pack and a Network Planning Supplementary Report (see Section 2) – and you'll have an opportunity to ask questions and engage with both Transgrid and AEMO.

Step 3: Prepare your Connection Application

Use the information you gathered to undertake the required technical studies and prepare your Connection Application package for submission. Your Commercial Proposal Manager will guide you through the process, but you are responsible for providing the required information and responding to requests from Transgrid and AEMO during the assessment.

Step 4: Due diligence by Transgrid and AEMO

Transgrid, in consultation with AEMO, will assess the Connection Application to ensure your project meets the technical and performance requirements of the NER. This will include negotiating performance standards and assessing system strength requirements.

Step 5: Obtain connection approvals

Once the assessment is complete, including agreeing performance standards and completing the system strength assessment, Transgrid and AEMO will provide responses under clauses 5.3.4A and 5.3.4B of the NER.

Step 6: Progress to an Offer to Connect

Transgrid will issue you an Offer to Connect. Once the connection agreement is executed, and you and Transgrid have jointly notified AEMO (in accordance with the NER), your project becomes Committed.

Figure 1-1 shows the high-level stages and assessments of the Application to Connection process with additional detail provided in Figure 1-2.

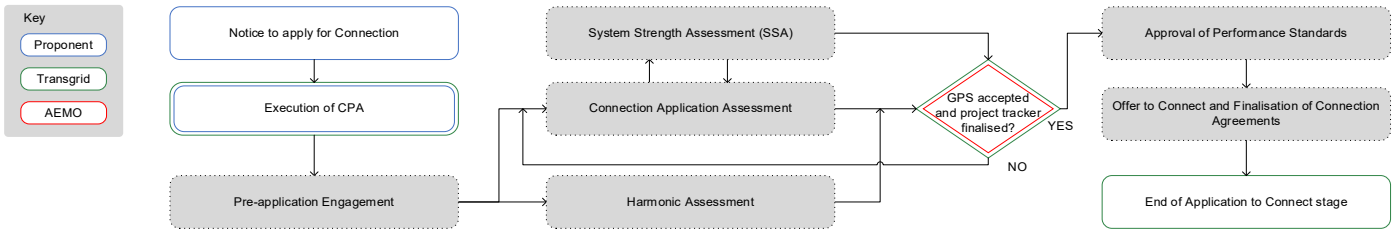


Figure 1-1: Overview of Connection Application process

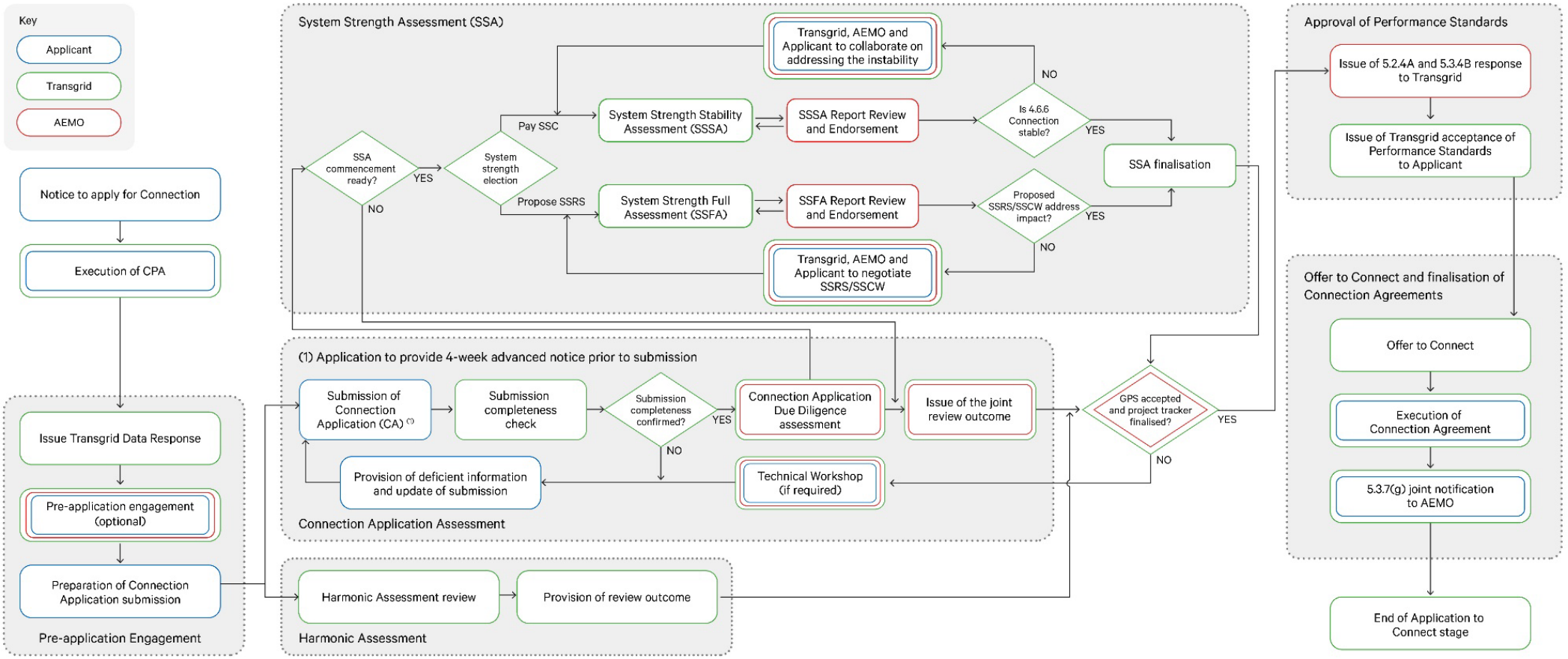


Figure 1-2: Connection Application process – key activities and assessments

1.4 How to use this Guide

Please use this Guide in conjunction with the National Electricity Rules (NER), AEMO guidelines and procedures, and project-specific information from Transgrid (see Section 2).

The remaining sections follow the chronological order of your Connection Application process. Consult it as you:

- Receive your network data – understand what information Transgrid will provide and your opportunities to ask questions and engage with Transgrid and AEMO before moving to design (Section 2)
- Develop your plant design and models – understand the design considerations and modelling requirements that support your application (Sections 3-4)
- Develop your performance standards – get advice on how to assess performance standards, including expectations and acceptance criteria and common submission mistakes (Section 5)
- Prepare and submit your application – discover what we expect your Connection Application package to contain, including additional guidance on areas where we often need to request more information from applicants (Section 6)
- Understand what happens next – sets out the assessment process and the key steps after submission (Sections 7-8)

Note: This Guide does not replace the requirements of the NER, AEMO procedures, applicable standards, or project-specific advice from Transgrid or AEMO. If you are unsure or the guidance appears inconsistent, follow the NER and other regulatory instruments.